

**THE UNIVERSITY OF CHICAGO**

**0000000000000000000000000000000000**



Arg	Phe	Ser	Arg	Gln	Cys	Val	Val	Asp	Lys	Asp	Lys	Arg	Asn	Gln	Cys	
			100				105						110			
cgc	tac	tgc	agg	ctc	aag	aaa	tgc	ttc	cgg	gct	ggc	atg	aag	aag	gaa	441
Arg	Tyr	Cys	Arg	Leu	Lys	Lys	Cys	Phe	Arg	Ala	Gly	Met	Lys	Lys	Glu	
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gcc	gtc	cag	aat	gag	cgg	gac	cgg	atc	agc	act	cga	agg	tca	agc	tat	489
Ala	Val	Gln	Asn	Glu	Arg	Asp	Arg	Ile	Ser	Thr	Arg	Arg	Ser	Ser	Tyr	
			130				135						140			
gag	gac	agc	agc	ctg	ccc	tcc	atc	aat	gcg	ctc	ctg	cag	gcg	gag	gtc	537
Glu	Asp	Ser	Ser	Leu	Pro	Ser	Ile	Asn	Ala	Leu	Leu	Gln	Ala	Glu	Val	
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ctg	tcc	cga	cag	atc	acc	tcc	ccc	gtc	tcc	ggg	atc	aac	ggc	gac	att	585
Leu	Ser	Arg	Gln	Ile	Thr	Ser	Pro	Val	Ser	Gly	Ile	Asn	Gly	Asp	Ile	
			165				170						175			
cgg	gcg	aag	aag	att	gcc	agc	atc	gca	gat	gtg	tgt	gag	tcc	atg	aag	633
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			180				185						190			
gag	cag	ctg	ctg	gtt	ctc	gtt	gag	tgg	gcc	aag	tac	atc	cca	gct	ttc	681
Glu	Gln	Leu	Leu	Val	Leu	Val	Glu	Trp	Ala	Lys	Tyr	Ile	Pro	Ala	Phe	
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Cys	Glu	Leu	Pro	Leu	Asp	Asp	Gln	Val	Ala	Leu	Leu	Arg	Ala	His	Ala	
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Gly	Glu	His	Leu	Leu	Leu	Gly	Ala	Thr	Lys	Arg	Ser	Met	Val	Phe	Lys	
			225				230						235			240
gac	gtg	ctg	ctc	cta	ggc	aat	gac	tac	att	gtc	cct	cgg	cac	tgc	ccg	825
Asp	Val	Leu	Leu	Leu	Gly	Asn	Asp	Tyr	Ile	Val	Pro	Arg	His	Cys	Pro	
			245				250						255			
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Glu	Leu	Ala	Glu	Met	Ser	Arg	Val	Ser	Ile	Arg	Ile	Leu	Asp	Glu	Leu	
			260				265						270			
gtg	ctg	ccc	ttc	cag	gag	ctg	cac	atc	gat	gac	aat	gag	tat	gcc	tac	921
Val	Leu	Pro	Phe	Gln	Glu	Leu	His	Ile	Asp	Asp	Asn	Glu	Tyr	Ala	Tyr	
			275				280						285			
ctc	aaa	gcc	atc	atc	ttc	ttt	gac	cca	gat	gcc	aag	ggg	ctg	agc	gat	969
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			290				295						300			
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Pro	Gly	Lys	Ile	Lys	Arg	Leu	Arg	Ser	Gln	Val	Gln	Val	Ser	Leu	Glu	
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gac	tac	atc	aac	gac	cgc	cag	tat	gac	tcg	cgt	ggc	cgc	ttt	gga	gag	1065
Asp	Tyr	Ile	Asn	Asp	Arg	Gln	Tyr	Asp	Ser	Arg	Gly	Arg	Phe	Gly	Glu	

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Leu	Leu	Leu	Leu	Leu	Pro	Thr	Leu	Gln	Ser	Ile	Thr	Trp	Gln	Met	Ile	
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Glu	Gln	Ile	Gln	Phe	Ile	Lys	Leu	Phe	Gly	Met	Ala	Lys	Ile	Asp	Asn	
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gcc	cac	cac	ccc	ctg	cac	cct	cac	ctg	atg	cag	gaa	cat	atg	gga	acc	1257
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Asn	Val	Ile	Val	Ala	Asn	Thr	Met	Pro	Thr	His	Leu	Ser	Asn	Gly	Gln	
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Gln	Pro	Thr	Ile	Thr	Lys	Gln	Glu	Val	Ile	*						
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agt	cca	gaa	tcc	aag	gac	tca	aca	gag	atg	tcc	ctg	gag	aga	tcc	tcc	427
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cag	gac	ccc	tct	gtc	ccc	cag	aac	ccc	cca	acc	cca	ctg	ggg	cac	tcc	475
Gln	Asp	Pro	Ser	Val	Pro	Gln	Asn	Pro	Pro	Thr	Pro	Leu	Gly	His	Ser	
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Asn	Pro	Leu	Asp	His	Gln	Ile	Pro	Leu	Asp	Pro	Pro	Ala	Pro	Glu	Val	
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gtc	cct	acc	cca	tct	gac	tgg	acc	aag	gcc	tgc	gag	gcc	agc	tgg	cag	571
Val	Pro	Thr	Pro	Ser	Asp	Trp	Thr	Lys	Ala	Cys	Glu	Ala	Ser	Trp	Gln	
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tgg	ggc	gct	ctc	acc	aca	tgg	aac	agc	ccc	cca	gtc	gtc	ccc	gcc	aac	619
Trp	Gly	Ala	Leu	Thr	Thr	Trp	Asn	Ser	Pro	Pro	Val	Val	Pro	Ala	Asn	
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gag	ccc	agc	ctg	cgg	gag	ctg	gtg	cag	ggc	cgc	ccg	gcg	ggg	gcg	gag	667
Glu	Pro	Ser	Leu	Arg	Glu	Leu	Val	Gln	Gly	Arg	Pro	Ala	Gly	Ala	Glu	
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Lys	Pro	Tyr	Ile	Cys	Asn	Glu	Cys	Gly	Lys	Ser	Phe	Ser	Gln	Trp	Ser	
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Lys	Leu	Leu	Arg	His	Gln	Arg	Ile	His	Thr	Gly	Glu	Arg	Pro	Asn	Thr	
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Cys	Ser	Glu	Cys	Gly	Lys	Ser	Phe	Thr	Gln	Ser	Ser	His	Leu	Val	Gln	
180					185					190					195	
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His	Gln	Arg	Thr	His	Thr	Gly	Glu	Lys	Pro	Tyr	Lys	Cys	Pro	Asp	Cys	
			200						205					210		
ggc	aag	tgc	ttc	agc	tgg	agc	tcc	aac	ctg	gtg	cag	cac	cag	cgc	acg	907
Gly	Lys	Cys	Phe	Ser	Trp	Ser	Ser	Asn	Leu	Val	Gln	His	Gln	Arg	Thr	
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His	Thr	Gly	Glu	Glu	Pro	Tyr	Lys	Cys	Thr	Glu	Cys	Glu	Ile	Ala	Phe	
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acc	cag	agc	acc	aac	ctc	atc	aag	cac	cag	cga	tcc	cac	acc	ggc	gag	1003
Thr	Gln	Ser	Thr	Asn	Leu	Ile	Lys	His	Gln	Arg	Ser	His	Thr	Gly	Glu	
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Lys</																

gac Asp	ctc Leu	atc Ile	cag Gln	cac His 280	cag Gln	gcc Ala	acc Thr	cac His 285	aca Thr	ggc Gly	gag Glu	aaa Lys	ccc Pro	tac Tyr 290	aag Lys	1099
tgc Cys	ccc Pro	gag Glu	tgc Cys 295	ggg Gly	aag Lys	cgc Arg	ttc Phe	ggc Gly 300	cag Gln	aac Asn	cac His	aac Asn	ctc Leu 305	ctc Leu	aag Lys	1147
cac His	cag Gln	aag Lys 310	atc Ile	cac His	gcg Ala	ggc Gly	gag Glu 315	aag Lys	cca Pro	tac Tyr	cgc Arg	tgc Cys 320	acc Thr	gag Glu	tgc Cys	1195
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cac His 340	aca Thr	ggc Gly	gag Glu	aag Lys	ccc Pro 345	tac Tyr	gag Glu	tgc Cys	cta Leu	gag Glu	tgc Cys	ggc Gly	aag Lys	agc Ser	ttc Phe 355	1291
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gac Asp	ccg Pro	ttc Phe	aag Lys 375	tgc Cys	cca Pro	gtg Val	tgc Cys	ggc Gly 380	aag Lys	acc Thr	ttc Phe	acc Thr	ctg Leu	agc Ser	gcc Ala	1387
acg Thr	ttg Leu	ctg Leu	cgg Arg	cac His	cag Gln	cgc Arg	acg Thr 395	cac His	acg Thr	ggc Gly	gag Glu	cgg Arg	ccc Pro	tac Tyr	aag Lys	1435
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cac His 420	cag Gln	cgc Arg	atc Ile	cac His	cgc Arg	ggc Gly	gag Glu	cgg Arg	ccc Pro	tac Tyr 430	atc Ile	tgc Cys	gcc Ala	gac Asp	tgc Cys 435	1531
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cac His	acc Thr	ggt Gly	gag Glu	aag Lys	ccc Pro	tac Tyr	aag Lys	tgt Cys 460	tcc Ser	gac Asp	tgc Cys	ggc Gly	aag Lys	agc Ser	ttc Phe	1627
atc Ile	cgc Arg	agc Ser	tcc Ser	cac His	ctt Leu	atc Ile	cag Gln	cac His	cgc Arg	cgc Arg	acg Thr	cac His	acc Thr	ggc Gly	gag Glu	1675
aag Lys	ccc Pro	tac Tyr	aag Lys	tgc Cys	ccc Pro	gag Glu	tgc Cys	ggc Gly	aag Lys	agc Ser	ttc Phe	agc Ser	cag Gln	agc Ser	tcc Ser	1723
aac	ctt	att	acc	cac	gtc	cgc	acg	cac	atg	gac	gag	aac	ctg	ttc	gtg	1771





735

accaggggct ctggagcccc cagaggaqat aagacagaga ctaggaagaa aagggtcccac 3483





**09-06-2017**

ctc cct cca gat agc agt gaa gcc gag att ata gat gaa atc tta aag 752  
Leu Pro Pro Asp Ser Ser Glu Ala Glu Ile Ile Asp Glu Ile Leu Lys  
25 30 35

aac ttg ttt agc aac aaa gtc ctc aat gcc ttg aaa cca gaa aaa gat 848  
Asn Leu Phe Ser Asn Lys Val Leu Asn Ala Leu Lys Pro Glu Lys Asp  
55 60 65

gtg gat gga gta aca gac ata aac ctg ggg aag ctg gtg cga ggg gat 896  
Val Asp Gly Val Thr Asp Ile Asn Leu Gly Lys Leu Val Arg Gly Asp  
70 75 80

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gcc cat gaa tgt ttt gtt tca cct gtt gcc aaa gct gta att gaa ctt      944
Ala His Glu Cys Phe Val Ser Pro Val Ala Lys Ala Val Ile Glu Leu
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ctt gaa aaa tca gta ggt gtc aac cta gat gga aag aag att ttg gta 992  
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gtg ggg gcc cat ggg tct ttg gaa gct gct cta caa tgc ctg ttc cag 1040  
Val Gly Ala His Gly Ser Leu Glu Ala Ala Leu Gln Cys Leu Phe Gln  
120 125 130

aga aaa ggg tcc atg aca atg agc atc cag tgg aaa aca cgc cag ctt 1088  
Arg Lys Gly Ser Met Thr Met Ser Ile Gln Trp Lys Thr Arg Gln Leu  
135 140 145

caa agc aag ctt cac gag gct gac att gtg gtc cta ggc tca cct aag 1136  
Gln Ser Lys Leu His Glu Ala Asp Ile Val Val Leu Gly Ser Pro Lys  
150 155 160

cca gaa gag att ccc ctt act tgg ata caa cca gga act act gtt ctc 1184  
Pro Glu Glu Ile Pro Leu Thr Trp Ile Gln Pro Gly Thr Thr Val Leu  
165 170 175 180

13



405	410								415								420								
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gtg Val	gac Asp	aag Lys	ata Ile	agg Arg	acc Thr	att Ile	gct Ala	cag Gln	gct Ala	gtc Val	tat Tyr	gga Gly	gcc Ala	aaa Lys	gat Asp	2960
att Ile	gaa Glu	ctc Leu	tct Ser	cct Pro	gag Glu	gca Ala	caa Gln	gcc Ala	aaa Lys	ata Ile	gat Asp	cgt Arg	tac Tyr	act Thr	caa Gln	3008
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Met Ser Arg Lys Pro  
1 5  
cga gcc tcc agc cca ttg tcc aac aac cac cca cca aca cca aag agg 403  
Arg Ala Ser Ser Pro Leu Ser Asn Asn His Pro Pro Thr Pro Lys Arg  
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Pro Gly Thr Lys Gly Ser Pro \*  
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gcc Ala	aaa Lys	atg Met	gta Val	gcc Ala	agg Arg	ttt Phe	ttt Phe	cta Leu	cag Gln	ctt Leu	ggt Gly	gac Asp	tat Tyr	ggg Gly	tct Ser	914
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tct Ser	gaa Glu	gac Asp	act Thr	act Thr	aat Asn	gaa Glu	gac Asp	tat Tyr	caa Gln	agc Ser	att Ile	gcc Ala	tta Leu	tac Tyr	ttt Phe	1058
	335					340					345					
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ggc Gly	caa Gln	tat Tyr	tca Ser	cga Arg	gca Ala	ctt Leu	aaa Lys	cac His	ttc Phe	ctg Leu	aaa Lys	tgc Cys	cca Pro	agc Ser	tcg Ser	1154
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Lys Asp Glu Leu Leu Thr Asn Gln Leu Ile Asp His Leu Leu Gly Glu	
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Asn Asp Ser Met Pro Lys Asp Ala Lys Tyr Leu Phe Arg Leu Tyr Met	
415 420 425 430	
gct ctg aag caa tac cga gaa gct gcc cag act gcc atc atc att gcc	1346
Ala Leu Lys Gln Tyr Arg Glu Ala Ala Gln Thr Ala Ile Ile Ile Ala	
435 440 445	
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Arg Glu Glu Gln Ser Ala Gly Asn Tyr Arg Asn Ala His Asp Val Leu	
450 455 460	
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Phe Ser Met Tyr Ala Glu Leu Lys Ser Gln Lys Ile Lys Ile Pro Ser	
465 470 475	
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Glu Met Ala Thr Asn Leu Met Ile Leu His Ser Tyr Ile Leu Val Arg	
480 485 490	
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Phe Met Leu Lys Met Glu Ile Thr *	
495 500	
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Asp Ala Val Ala Arg Arg Ala Leu Glu Val Ser Gln Ala Pro Val Ile	
215 220 225	
ttc tcc cac tcg gct gcc cgg ggt gtg tgc aac agt gct cgg aat gtt	956
Phe Ser His Ser Ala Ala Arg Gly Val Cys Asn Ser Ala Arg Asn Val	
230 235 240	
cct gat gac atc ctg cag ctt ctg aag aag aac ggt ggc gtc gtg atg	1004
Pro Asp Asp Ile Leu Gln Leu Leu Lys Lys Asn Gly Gly Val Val Met	
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gtg tct ttg tcc atg gga gta ata cag tgc aac cca tca gcc aat gtg	1052
Val Ser Leu Ser Met Gly Val Ile Gln Cys Asn Pro Ser Ala Asn Val	
260 265 270	
tcc act gtg gca gat cac ttc gac cac atc aag gct gtc att gga tcc	1100
Ser Thr Val Ala Asp His Phe Asp His Ile Lys Ala Val Ile Gly Ser	
275 280 285 290	
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Lys Phe Ile Gly Ile Gly Gly Asp Tyr Asp Gly Ala Gly Lys Tyr Arg	
295 300 305	
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Lys Lys Thr Lys Cys Lys Ala Pro Trp Arg Thr Ser Ser Arg Met Ser	
310 315 320	
agc tga gcagttcctg ccactccgac ctctcacgtc tgcgtcagag acagagtctg	1252
Ser *	
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[illegible]

24







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cct	gac	aga	atc	ggg	cat	gga	aca	ttt	ctc	aac	tcc	ggg	gag	gga	gga	742
Pro	Asp	Arg	Ile	Gly	His	Gly	Thr	Phe	Leu	Asn	Ser	Gly	Glu	Gly	Gly	
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Ser	Leu	Asp	Leu	Val	Asp	Phe	Val	Arg	Gln	His	Arg	Ile	Pro	Leu	Glu	
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ctc	tgt	ttg	acc	tca	aac	gtc	aaa	agt	cag	aca	gtt	cca	tct	tat	gac	838
Leu	Cys	Leu	Thr	Ser	Asn	Val	Lys	Ser	Gln	Thr	Val	Pro	Ser	Tyr	Asp	
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Gln	His	His	Phe	Gly	Phe	Trp	Tyr	Ser	Ile	Ala	His	Pro	Ser	Val	Ile	
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Cys	Thr	Asp	Asp	Lys	Gly	Val	Phe	Ala	Thr	His	Leu	Ser	Gln	Glu	Tyr	
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cag	ctg	gca	gct	gaa	aca	ttt	aat	ttg	acc	cag	tct	cag	gtg	tgg	gat	982
Gln	Leu	Ala	Ala	Glu	Thr	Phe	Asn	Leu	Thr	Gln	Ser	Gln	Val	Trp	Asp	
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